BEFORE THE
PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA

DOCKET NO. 2019-182-E

In the Matter of: South Carolina Energy Freedom Act (H.3659) Proceeding Initiated Pursuant to S.C. Code Ann. Section 58-40-20(C): Generic Docket to (1) Investigate and Determine the Costs and Benefits of the Current Net Energy Metering Program and (2) Establish a Methodology for Calculating the Value of the Energy Produced by Customer-Generators	**REBUTTAL TESTIMONY OF DR. JULIUS A. WRIGHT FOR DUKE ENERGY CAROLINAS, LLC AND DUKE ENERGY PROGRESS, LLC**

I. INTRODUCTION AND SUMMARY

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. Dr. Julius ("Chip") A. Wright, 18 Edgewater Drive, Cartersville, GA 30121.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am the Managing Partner of J. A. Wright & Associates, LLC. In that role, I act as a consultant to regulated utilities and regulatory agencies and other public bodies on issues related to economics, economic modeling, regulatory policy, industry restructuring, demand-side investments, and resource planning.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING THIS TESTIMONY?

A. I am submitting this testimony on behalf of Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP") (DEC and DEP are herein referred to collectively as the "Companies").

Q. DID YOU PREVIOUSLY FILE DIRECT TESTIMONY IN THIS PROCEEDING?

A. Yes.

Q. HOW WOULD YOU SUMMARIZE THE DIRECT TESTIMONY AND ISSUES RELATED TO THE CONSIDERATION OF THE DIRECT AND INDIRECT ECONOMIC BENEFITS OF A NEW NET ENERGY METERING ("NEM") TARIFF IN THIS DOCKET?

A. I believe there are two basic points that are clear from the direct testimony. First, the testimony has shown that the issue of economic modeling of direct and indirect economic benefits is not a straightforward exercise, but rather will take great care and involve a number of issues. The second point is that the witnesses

have all been discussing theoretical issues, when in fact what is most important to this Commission and ratepayers is how these economic considerations are incorporated into and impact the design of future NEM cost analysis and any related NEM tariffs. Consequently, it is future proceedings that relate to the design of new solar NEM tariffs where these economic issues will be further developed and applied.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to rebut the testimony of several intervenors where I believe necessary, and to provide a view on how the different information in this docket could be used in future proceedings. Specifically, I will rebut certain testimony related to the consideration of direct and indirect economic benefits in evaluating the NEM programs established under S.C. Act No. 236 of 2014.

Q. PLEASE SUMMARIZE YOUR REBUTTAL TESTIMONY.

A. In my rebuttal testimony, I discuss why I am generally in agreement with the South Carolina Office of Regulatory Staff's (the "ORS") Witness Horii's conclusion that indirect economic benefits should not be included in the primary valuation of NEM. I also agree with ORS Witness Horii's[1] suggestion that policy-makers may use evidence of positive statewide economic benefits to support a solar policy, provided that the estimates of the direct and indirect economic benefits address the numerous considerations I discuss in my direct

[1] Direct Testimony of Brian Horii p. 6-7.

testimony. Also, the Commission should recognize that often the results from these economic models are not without controversy.

I also take exception to the testimony of SEIA/NCSEA Witness Barnes. Specifically, I disagree with his recommendation that the state policy to avoid disruption of the private distributed energy resources ("DER") market means that this Commission must adopt cost-shifting policies to provide financial subsidies to the solar industry. Likewise, he also recommends that the Commission take a "broad and forward-looking" view when assessing the benefits of DER and by "forward-looking" he means giving consideration to potential benefits of new technologies. My concern with this recommendation that there is no reasonable way the Commission can implement this recommendation at this time given that the economic consequences of future, potential new technologies remain speculative, at best.

Finally, I discuss why I believe SCCCL/SACE/UF/VS Witness Hefner's economic modeling of the direct, indirect, and induced economic impacts has several shortcomings. First, it is impossible to reconcile his employment data from the information in his report's references, but what I could find seems to indicate that some solar-related jobs located in the Charlotte, NC area may have been counted in the South Carolina data base. Second, it fails to adjust his gross economic impacts in order to provide what is termed the net economic impacts, which is the appropriate information the Commission needs in this proceeding. Third, I do not see where his study has accounted for the costs or cost impacts of solar incentives. And finally, his study appears to assume that solar energy is a

direct substitute for fossil-based electric generation, which I do not believe is correct and I believe is an issue that needs additional study. In sum, these errors, at best, overstate any economic benefit and—at worst—actually understate potential economic harm.

In sum, the Commission could rely upon positive economic benefit to the State in considering net metering matters. However, such reliance should be qualitative in nature and could be used more as a "tie breaker" fashion and not as a means to justify undue cross subsidization.

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. The remainder of my testimony is organized as follows. Section II discusses my concerns with the testimony of ORS Witness Horii. Section III discusses my concerns with the testimony of SEIA/NCSEA Witness Barnes. Section IV discusses my concerns with the testimony of SCCCL/SACE/UF/VS Witness Hefner, and Section V provides my recommendations.

II. RESPONSE TO DIRECT TESTIMONY OF ORS WITNESS HORII

Q. WHAT IS THE FIRST ISSUE ORS WITNESS HORII DISCUSSES THAT YOU WISH TO ADDRESS?

A. By and large, I am in agreement with ORS Witness Horii's testimony, and particularly his observation that "indirect [economic] benefits should not be included in the primary valuation of NEM."[2] However, he goes on to say that "such benefits can be included in consideration of the tradeoffs between the goal of eliminating any cost shift to the greatest extent practicable and the South

[2] Direct Testimony of Brian Horii p. 6, lines 3-4.

Carolina General Assembly's intent to avoid disruption to the growing market for customer-scale distributed energy resources." He then provides an example of how these economic benefits might be considered in the context of revaluating a particular program's cost and benefits. My only concern with this example is that it may be taken to imply that quantifying these economic benefits is a non-controversial straightforward modeling exercise, which I caution the Commission is not always the case. However, I believe I am in agreement with ORS Witness Horii that this information should be largely taken on a qualitative basis and possibly used to distinguish between or support programs or policies that avoid cost shifting to the greatest extent practicable.

Q. PLEASE EXPLAIN YOUR CONCERN THAT QUANTIFYING THE ECONOMIC BENEFITS OF A SOLAR PROGRAM IS NON-CONTROVERSIAL.

A. ORS Witness Horii has suggested that if a solar choice program was estimated to produce large economic benefits, these benefits may justify, from a policy standpoint, shifting costs to other customers. This suggestion may be taken to imply identifying and estimating these economic benefits is a straightforward and non-controversial task. As I explain in my direct testimony, these types of economic impact modeling studies require careful consideration and can produce results that are quite contentious. I would add that Witness Everett has also provided the same caution on behalf of Dominion Energy South Carolina, Inc.

("Dominion")[3] and identified several issues related to modeling the economic impacts of NEM tariffs. Likewise, Dominion Witness Everett and I are aligned with our recommendation that the Commission not adopt in this proceeding any quantification of the direct and indirect economic benefits in the solar net metering cost benefit analysis.[4]

Q. DO YOU AGREE WITH ORS WITNESS HORII'S SUGGESTIONS ON PAGE 33, LINES 11 THROUGH 16, REGARDING THE SHORT AND LONG TERM ECONOMIC IMPACTS FROM NEM PROGRAMS?

A. Those suggestions seem to indicate that it is likely in the short-term that there would be an increase in economic activity (using economic modeling estimates like a REMI or IMPLAN model), but due to higher electric rates, a long-term economic decline would follow. I agree with his long-term assessment, but I am not sure that the economic impact in the short-run would be positive. I simply do not know at this time because most of the studies I have seen related to this question do not have what I have termed a "but-for" analysis—rather, what economic alternatives were foregone by virtue of investing in solar. Absent this type of analysis, it is difficult for me to reach a conclusion, thus I am not able to concur with ORS Witness Horii's assertion of short-term impacts at this time.

[3] Direct Testimony of Margot Everett p. 7, lines 17-22 and p. 8, lines 1-12.
[4] Direct Testimony of Margot Everett p. 8, lines 14-18.

III. RESPONSE TO DIRECT TESTIMONY OF SEIA/NCSEA WITNESS BARNES

Q. WHAT IS THE FIRST ISSUE SEIA/NCSEA WITNESS BARNES DISCUSSES THAT YOU WISH TO ADDRESS?

A. In his direct testimony, SEIA/NCSEA Witness Barnes addresses the issue of direct and indirect economic benefits and suggests several conclusions and recommendations with which I disagree. First, he discusses what he termed the legislative intent of Act 62 that mentions "avoiding disruption of a growing DG market."[5] He goes on to comment that the goal of avoiding cost shifting "must be viewed in context with the other policy goals of avoiding disruption to the private DER market."[6] I acknowledge that Act 62 discusses these policy goals, but I am troubled if his discussion of these somewhat conflicting policies is meant to convey a recommendation that this Commission should adopt either uneconomic or cost shifting policies simply to provide financial subsidies to the solar industry and the—largely—more affluent consumers who can benefit from these policies. Moreover, in a future proceeding on NEM, if a party makes a claim that a policy is "disruptive to the private DER market," I believe such a claim would need to be affirmatively demonstrated to this Commission and any resulting harm should be quantified. Otherwise, such a claim would have no basis in facts and this Commission would have no basis upon which to make an evaluation.

[5] Direct Testimony of Justin R. Barnes p. 5, lines 1-4.
[6] Direct Testimony of Justin R. Barnes p. 6, lines 18-21.

Q. DO YOU HAVE ANY OTHER CONCERNS WITH THE DIRECT TESTIMONY OF SEIA/NCSEA WITNESS BARNES?

A. Yes, he recommends that the Commission take a "broad and forward-looking view when assessing the benefits of DG."[7] He goes on to explain that his term "broad" means the Commission should consider benefits that are more complex and difficult to quantify, while noting that "forward-looking" means giving consideration to potential benefits of new technologies—and he gives examples of battery storage and smart inverters. My concern with this recommendation is exactly how this Commission should implement his recommendation. It is practically impossible for the Commission to accurately quantify these "broad and forward-looking" benefits when evaluating an NEM tariff. SEIA/NCSEA Witness Barnes even acknowledges these "potential benefits that may be more difficult to quantify."[8] He also agrees the economic impacts he is suggesting the Commission consider are speculative or "potential future" benefits and that the economic consequences are based on forward-looking new technologies.[9] I see no reasonable way the Commission can appropriately consider in any quantitative fashion the economic consequences of such uncertain circumstances from what I would term "hoped for" results—nor do I see how the Commission could appropriately use these undefined hoped-for results or projections in a qualitative fashion.

[7] Direct Testimony of Justin R. Barnes p. 7, lines 8-9.
[8] Direct Testimony of Justin R. Barnes p. 7, lines 10-11.
[9] Direct Testimony of Justin R. Barnes p. 7, lines 10-17.

Q. IF THE COMMISSION BELIEVED IT IMPORTANT TO FURTHER EXAMINE THE ISSUE OF THE ECONOMIC BENEFITS AND COSTS RELATED TO WHAT SEIA/NCSEA WITNESS BARNES HAS DISCUSSED AS FORWARD-LOOKING OR NEW TECHNOLOGIES, HOW SHOULD IT PROCEED?

A. If the Commission seeks to study "forward-looking" issues or new technologies that may have potential benefits to the state and its consumers, then a study of that program could be undertaken by parties with appropriate experience. The results of such a study, if necessary, could be reported back to the Commission and the ORS for further evaluation.

IV. RESPONSE TO DIRECT TESTIMONY OF SCCCL/SACE/UF/VS WITNESS HEFNER

Q. WHAT CONCERNS DO YOU HAVE WITH SACE/CCL/UF/VS WITNESS HEFNER'S DIRECT TESTIMONY?

A. I believe SCCCL/SACE/UF/VS Witness Hefner's economic modeling of the direct, indirect, and induced economic impacts has several shortcomings. First, it is difficult to reconcile his employment data with some of National Solar Database information, and the data underlying his analysis may have resulted in an overstated level of employment. Second, it fails to adjust gross economic impacts in order to provide what is termed the "net economic impacts," which is the appropriate information the Commission should consider in this proceeding. Third, it appears his study has not accounted for the costs or cost impacts of solar incentives. And finally, his study discusses the EIA's projections of solar costs

and appears to assume that solar energy is a direct substitute for fossil-based electric generation. If that indeed is the assumption, then it is simply incorrect, and by relying on this incorrect assumption, his study has not addressed the basic overriding economic principle that choices should be based on overall economic efficiency. These errors, at best, overstate any economic benefit and at worst actually understate potential economic harm.

Q. PLEASE EXPLAIN HOW SACE/CCL/UF/VS WITNESS HEFNER'S ESTIMATED SOLAR-RELATED ECONOMIC IMPACTS MAY HAVE OVERSTATED EMPLOYMENT DATA?

A. In Exhibit A to SACE/CCL/UF/VS Witness Hefner's direct testimony, he provides a report titled "An Economic Analysis of the Solar Industry in South Carolina." SCCCL/SACE/UF/VS Witness Hefner's entire report's economic forecast relies upon an estimate of the number of South Carolina based jobs created by the solar industry. The fact that SACE/CCL/UF/VS Witness Hefner's estimate of the number of South Carolina solar jobs comes from a report from the Solar Foundation should also concern the Commission as likely being biased. Notwithstanding this likely bias, if this estimate of the number of solar jobs created is wrong, then SCCCL/SACE/UF/VS Witness Hefner's forecast of how much the solar industry contributes to South Carolina's economy—such as how much in additional tax dollars—simply cannot be relied upon as accurate. For example, this report claimed that in 2019 there were 3,307 solar jobs in South

Carolina.[10] However, in the background information in this report, it breaks down the number of solar related jobs by geographic region. This more detailed information appeared to indicate that 1,402 of the so-called South Carolina based solar jobs were actually located in the Charlotte-Gastonia-Concord North Carolina region. This same Solar Foundation also estimated the number of solar-related jobs in North Carolina, and—not surprisingly—reported these same 1,402 solar jobs as being based in the same Charlotte-Gastonia-Concord North Carolina region—but appeared to credit these jobs to North Carolina. In attempting to reconcile this information in further research, I could not find the back-up data to confirm or deny that this Charlotte area jobs had been double-counted and claimed for both states. Therefore, I simply do not have the data to verify whether the jobs counted in South Carolina were comprised of only jobs arising in South Carolina and did not also double-count jobs arising from other states.

Q. HOW DOES THIS POTENTIAL OVERCOUNTING OF THE NUMBER OF SOUTH CAROLINA RELATED SOLAR JOBS IMPACT SCCCL/SACE/UF/VS WITNESS HEFNER'S ECONOMIC ANALYSIS?

A. The potentially over-counted number of South Carolina direct solar jobs is impossible to estimate given the data I found—for example, the back-up Solar Foundation data I located estimated 2,235 solar jobs in the Greenville, Columbia, and Charleston greater metropolitan areas, but I could find no other data on the remainder of the state other than the Solar Foundation total jobs number. Basically, this means that if jobs arising in North Carolina were counted in

[10] The Solar Foundation Job Census at: https://www.thesolarfoundation.org/national/

SCCCL/SACE/UF/VS Witness Hefner's estimated solar-related economic impact, then his economic impact estimate is too high.

Q. PLEASE EXPLAIN YOUR CONCERN THAT SCCCL/SACE/UF/VS WITNESS HEFNER'S ECONOMIC ANALYSIS DOES NOT PROVIDE WHAT YOU HAVE TERMED THE "NET" ECONOMIC BENEFITS.

A. As I discuss in my direct testimony, one of the more important considerations in an economic impact analysis is to simply ask the question where would the dollars be spent—or a particular investment be made—"*but for"* the investment being evaluated. Therefore, an appropriate economic analysis would not only estimate the economic impact of the proposal itself—sometimes referred to as the gross economic impact—but it would also essentially subtract the foregone economic opportunity costs to yield what is called the net economic impacts. SACE/CCL/UF/VS Witness Hefner's study does not provide this "but for" option analysis so his estimated impacts is a gross impact number. While this does not mean his gross economic impact estimate is wrong, it simply does not convey the complete picture and it could also convey an incorrect conclusion by inflating the actual economic impact in favor of the solar industry.

Q. HAVE ANY OTHER STUDIES OF SOLAR-RELATED ECONOMIC IMPACTS IDENTIFIED THIS GROSS VERSUS NET ISSUE?

A. Yes. A recent (2019) study in North Carolina[11] that was very supportive of solar energy used the same IMPLAN model used by SACE/CCL/UF/VS Witness

[11] Petrusa, Jeffery, et. a., "Economic Impact Analysis of Clean Energy Development in North Carolina-2019 Update," RTI International, funded by the North Carolina Sustainable Energy Association, May, 2019.

Hefner. That study states that "the analysis does not consider the alternative uses for private investment dollars devoted to clean energy projects. As a result, the economic impact measures used in this report are best interpreted as gross versus net changes in state-level economic activity."[12] Another solar economic impact study in Arizona[13] that concluded increased adoption of distributed solar generation represented a loss to the Arizona economy noted that:

> [g]ross (positive impact only) studies clearly produce higher estimates of the economic impacts of solar enhancements than net studies"[14] and that "[g]ross studies only consider the direct positive impacts of increased economic activity in a specific sector, whereas Net studies represent a more thorough form of economic modeling as they also account for the trade-offs in the economy which result from incentivizing one specific sector.[15]

A third study that was conducted by Dr. Charles Cicchetti[16] provided a critical analysis of another study in which it was concluded that wind energy produced positive economic impacts. Dr. Charles Cicchetti's study simply questioned the results of that study by stating, "Navigant's job creation methodology never asks: 'Compared to what?'"[17] In summary, without some consideration of this "but for" question, SCCCL/SACE/UF/VS Witness Hefner's study is incomplete and presents an inflated level of economic impacts related to solar development in South Carolina.

[12] IBID, p. 1-3.
[13] James, Dr. Tim, et. al. "The Economic Impact of Distributed Solar in the APS Service Territory, 2016-2035," Siedman Research Institute, Arizona State University, Feb. 16, 2016.
[14] IBID, p. 27.
[15] IBID, p. 44.
[16] Cicchetti, Charles, Ph.D., "Inflated Numbers; Erroneous Conclusions: The Navigant Wind Jobs Report," American Energy Alliance, The National Center for Public Policy Research, 2013.
[17] IBID, p. iii.

Q. PLEASE EXPLAIN YOUR CONCERN THAT SCCCL/SACE/UF/VS WITNESS HEFNER'S ECONOMIC ANALYSIS HAS NOT ACCOUNTED FOR ANY SOLAR RELATED INCENTIVES OR RELATED RATE IMPACTS.

A. As I discuss in my direct testimony, to the extent that there are tax incentives or other incentives paid to promote solar adoption—which SACE/CCL/UF/VS Witness Hefner's study actually discusses—the impact of these incentives should be addressed. For example, if a tax incentive is paid, this means other government programs go unfunded or taxes are increased. In either case, it represents a negative impact on the economy, which should be considered in SACE/CCL/UF/VS Witness Hefner's modeling. Similarly, if the utility provides an incentive and this incentive is recovered in the rates of all ratepayers, this too represents an increase in all customers' cost of electricity which translates into a negative economic impact. To provide an accurate picture of economic benefits to the Commission, these negative economic impacts should also be addressed in SACE/CCL/UF/VS Witness Hefner's economic modeling.

Q. PLEASE EXPLAIN YOUR CONCERN WITH THE ASSUMPTION IN SCCCL/SACE/UF/VS WITNESS HEFNER'S ECONOMIC ANALYSIS THAT SOLAR ENERGY IS A DIRECT SUBSTITUTE FOR OTHER RESOURCES.

A. As I discuss in my direct testimony, an economic impact study that makes assumptions about a resource like solar energy must make sure that the economic analysis is a true apples-to-apples comparison. What this means is that in

SCCCL/SACE/UF/VS Witness Hefner's study, it appears he is assuming that the solar energy alternative is a direct substitute for a home-owners native load electric supplier—or that any additional costs to make it a direct substitute is subsumed in his predicted solar cost savings. This is a strong assumption and it is implied without sufficient proof.

In a related way, the assumption that solar is a direct substitute for other resources with no cost impacts also implies that the choice of solar is the overall economically-efficient choice. As I discuss in my direct testimony, it is important that sound economic principles be utilized in an economic impact analysis that is used for identifying the "best" resource option. In other words, energy policy should focus on policies that create the most cost-effective and reliable electricity. SACE/CCL/UF/VS Witness Hefner's study simply discusses the EIA's projected solar prices becoming competitive with natural gas generation—a comparison which says nothing about any related costs to make solar a true economically-efficient substitute for fossil-fired generation resources. I do not accept this assumption at this time because SACE/CCL/UF/VS Witness Hefner has not provided legitimate investigation and proof. Therefore, absent sufficient evidence upon which to conclude that solar is a direct substitute for other energy resources, or a way to make the aforementioned apples-to-apples comparison, it is impossible to use SCCCL/SACE/UF/VS Witness Hefner's analysis to reach any conclusions as to whether solar resources provide an economic benefit to South Carolina—and it certainly does not provide the quantifiable proof needed to even begin to consider how economic impacts should influence NEM tariff

development in South Carolina.

V. SUMMARY AND RECOMMENDATION

Q. PLEASE SUMMARIZE YOUR REBUTTAL TESTIMONY AND WHAT YOU RECOMMEND AS AN APPROPRIATE WAY FOR THIS COMMISSION TO CONSIDER DIRECT AND INDIRECT ECONOMIC IMPACTS WHEN DEVELOPING A NEW NEM TARIFF.

A. As my rebuttal testimony has shown, I have many agreements and a few concerns with the direct testimony in this docket. In many ways, I am in agreement with other witnesses in that there are various factors that must be considered in the appropriate quantification of the direct and indirect economic impacts from most solar policies or programs. Furthermore, as the Commission reviews SCCCL/SACE/UF/VS Witness Hefner's economic evaluations presented in this proceeding, I recommend that the Commission examine how his economic models have incorporated or addressed, if at all, the various modeling issues I have raised and how his failure to address these issues has likely substantially inflated his estimated economic impacts of solar energy in South Carolina (and exactly to whom the results should be applied between the three utilities' service territories and customer bases).

I believe the testimony in this proceeding has demonstrated that the evaluation of the direct and indirect economic benefits is not a simple or straightforward exercise and will be based on a number of assumptions. Consequently, while I believe such an analysis can provide the Commission some qualitative guidance as to the value of projected solar installations related to a

future NEM tariff, I do not think the economic analysis is precise or reliable enough at this time upon which to base any quantitative application of the results.

Q. DOES THIS CONCLUDE YOUR PRE-FILED REBUTTAL TESTIMONY AT THIS TIME?

A. Yes, at this time.